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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,304	03/12/2001	Jae Hwan Kim		2103

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EXAMINER

GRAHAM, ANDREW R

ART UNIT PAPER NUMBER

2644

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/805,304	Applicant(s) KIM, JAE HWAN	
	Examiner Andrew Graham	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to new claims 7-10 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 10** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 incorporates the limitations of Claim 7. Claim 10 recites "a sound absorption member" in line 2 of the claim. It is unclear if this layer is the same or different member referred to in line 4 of Claim 7, though Figure 4 of the present application suggests that it is intended to be interpreted as the same. Accordingly, it is also unclear to which of these possible members the reference of "said absorption member" of line 7 in Claim 10 is referring. Appropriate correction or clarification is required.

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Claim Rejections - 35 USC § 103

3. **Claims 7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (USPN 5783898) in view of Baz (USPN 5485053) and Salloway et al (GB 2312972). Hereafter, "Salloway et al" will be referred to as "Salloway".

Wu discloses the use of fully passive, non-complex components to reduce vibrational amplitudes in structures.

Specifically regarding **Claim 7**, Wu teaches:

A smart panel (comprising 26,20) for reducing noise over a wide bandwidth (damping of two or more frequency modes) (col. 3, lines 18-37; col. 5, lines 6-48), comprising:

a board structure (26) which produces noise in an audible frequency band ("acoustic structure", col. 1, lines 54-57; col. 3, lines 31-37; example frequency ranges shown as 20-200 Hz, Figures 7a-7c)

at least one piezoelectric unit (20) for decreasing noise generated by said board structure (26) when said audible resonance frequency (natural frequency of the mode of vibration, such as ω_1) of is propagated (col. 4, lines 11-37 and 57-64; col. 6, lines 37-50)

said piezoelectric unit (20) comprising a piezoelectric member (22) and a tunable shunt circuit (32) connected with said piezoelectric (22) member for electrically resonating impedance of said piezoelectric member (col. 3, lines 38-67; col. 4, lines 1-12).

While Wu notes the existence of energy absorbing materials (col. 1, lines 22-25), Wu does not specify:

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- a sound absorption member for decreasing noise generated by said board structure in an audible frequency band,
- said sound absorption member being attached to one face surface of said board structure;
- said piezoelectric unit being attached to said board structure on a face surface of said board structure opposite said sound absorption member

However, the combined use of piezoelectric and energy-absorbing materials in the same damping system were known in the art, as evidenced by the teachings of Baz.

Baz discloses a system that employs both unconstrained and electrically connected, piezoelectric damping layers.

Specifically regarding **Claim 7**, Baz teaches:

a sound absorption member (10) for decreasing noise generated by said board structure (20) in an audible frequency band (col. 2, lines 19-42; col. 10, lines 7-12 and 25-36),

said sound absorption member being attached to one face surface of said board structure (10 is adjacent to 20, Figure 25);

said sound absorption member being attached to one face surface of said board structure opposite said sound absorption member (Figure 25 illustrates member (10) attached to back surface of board (20) to which piezoelectric sensor (40), in view of (22) of Wu, is attached; col. 4, lines 54-65).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include a passive damping layer to

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the system of Wu to provide additional damping, including said damping layer being on the opposite side of a vibrating board structure from a piezoelectric sensor, as is disclosed by Baz. The motivation behind such a modification would have been that such multilayer damping would have provided higher damping ratios over a broad range of temperatures and frequencies.

Further, Wu teaches that the patches are at locations with at least one mode, which implies that the patches are not at nodal locations (col. 4, lines 56-57). Baz teaches that patches are placed at optimal locations to control several bending modes of vibrations (col. 5, lines 11-15).

However, Wu in view of Baz does not clearly specify:

- said piezoelectric unit being attached to an anti-nodal point of said board structure on a face surface of said board structure.

However, such a form of connection was known in the art, as is evidenced by the teachings of Salloway.

Salloway teaches a connection of a piezoelectric damping member to a planar element.

Specifically regarding **Claim 7**, Salloway teaches:

- said piezoelectric unit (comprising 2,3 in view of 22 of Wu) being attached to an anti-nodal point of said board structure (1) on a face surface of said board structure (upper side, Figure 1)(page 3, lines 12-21; page 6, lines 22-23; page 7, lines 1-2).

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To one of ordinary skill in the art at the time the invention was made, it would have been obvious to implement the system of Wu in view of Baz with the sensor (22) of Wu applied on an anti-node location, as is taught for the sensor/actuator unit in the system of Salloway. The motivation behind such a modification would have been that such placement would have maximized both vibration sensitivity as well as suppression, as is taught by Salloway.

Regarding **Claim 8**, Wu in view of Baz and Salloway teaches:

said shunt circuit (32 of Wu) includes resistive and inductive components (Figures 2-6 of Wu).

Regarding **Claim 9**, Wu in view of Baz and Salloway teaches:

a plurality of said piezoelectric units (comprising 22a-22c and circuitry for particular modes at patch locations in 32, col. 7, lines 6-43 of Wu) each attached to anti-nodal points (26a-26c areas of Wu, in view of maximum suppression taught by Falloway) of said board structure (structural element of Wu) on a face surface of said board structure opposite said sound absorption member (in view of opposite placement of 40 and 10 with respect to 20 in Baz, Figure 25, in view of analogous components of Wu).

Allowable Subject Matter

4. **Claim 10** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening

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claims. Allowance of a rewritten Claim 10 would also require addressing the rejection under 35 U.S.C. 112 listed above.

The following is a statement of reasons for the indication of allowable subject matter:

While the prior art, particularly the teachings of Baz, has disclosed the use of multiple patches with pairs of board layers enclosing gaps of air, the examiner has not found prior art that teaches in its entirety, nor makes obvious through combination with other prior art, the including of a pair of said board structures separated by an air layer with one of said board structures having a sound absorption member on a face surface facing the other one of said board structures wherein each of said board structures has a piezoelectric unit for decreasing noise generated by the associated board structure when said audible resonance frequency is propagated, wherein said piezoelectric units are attached said board structures on face sides of said board structures opposite said sound absorption member and air layer, when such a limitation is taken into consideration with each and every other limitation of Claim 10 and its parent claim.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham

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whose telephone number is 571-272-7517. The examiner can normally be reached on Monday-Friday, 8:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AG

Andrew Graham
Examiner
A.U. 2644

ag
August 12, 2005



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